

UNITED STATES PATENT OFFICE.

ALEXANDER BAIN, OF LONDON, ENGLAND.

IMPROVEMENT IN COPYING SURFACES BY ELECTRICITY.

Specification forming part of Letters Patent No. 5,957, dated December 5, 1848.

To all whom it may concern:

Be it known that I, ALEXANDER BAIN, formerly of the city of Edinburgh, now of the city of London, and Kingdom of England, electrical engineer, at present in the city of Washington, and a subject of the Queen of Great Britain and Ireland, have invented and made and applied to use certain new and useful improvements in the means for taking copies of surfaces by electricity, by which improvements messages may be sent from one place to another at a distance, and for which said improvements I seek Letters Patent of the United States, as the same are shown in the specification of a patent issued to me under the Great Seal of the United Kingdom of Great Britain and Ireland on the 27th day of May, 1843, and which specification was duly enrolled the 27th day of November, in the same year, wherein the said invention and improvements were fully and substantially set forth, as hereinafter described and shown, reference being had to the drawings annexed, which show my improvements for taking copies of surfaces—for instance, the surface of printers' types—at distant places.

In these drawings the conjoined figure in Sheet 1 represents certain improvements in electric time-pieces, as the same are employed by me for the purpose of giving isochronous movements to the transmitting and copying portions of the machinery, and shows a method of making two pendulums at a distance regulate each other so as to keep the same time. The like marks of reference apply to the same parts in both portions of this figure. In these A A are the backs of the inclosing-cases. B B are two pendulums, of the same length, suspended at N N. C C are two permanent magnets. F F are two multiplied coils of wire attached to the springs D D. G G are two similar catches, one attached to each of the pendulum-bobs. L L is a section of the earth. H K are plates of metal. O is a galvanic battery with one pole connected with the plate K. To the other pole is connected or attached the wire M, which leads up to the spring D. This is in connection with one end of the coil F, the other end being connected with the metallic catch E. The end of a similar wire is connected with the catch G of the pendulum and

led up the rod into connection with the lower end of the pendulum-spring, the springs of the two pendulums being connected by the top wire, M'. The connections are similar at the other pendulum, and the current returned by the earth, as shown by the arrows at L. The pendulums will be kept in motion by clocks in the ordinary manner, and made to move in the same direction and at the same time. When the two pendulums are near the extremity of their vibrations to the left and the catches on the bobs are in contact with the catches beneath the electric circuit is completed, and the current will pass through the pendulums and wires, at the same causing the coils F F to be attracted by the magnets, and thus depressing the catches E E, and by these means allowing the catches G to pass over them, and when the pendulums have passed over the catch E the current is broken until upon their return vibration the faces of the catches G come into contact with the faces of the catches E; and should one pendulum arrive at this point first it must remain until the other comes up to the like point at the other station to complete the electric circuit, when the catches E will be again depressed by the attraction of the magnets and both pendulums be released simultaneously.

Figures 1 and 2, Sheet 2, represent two machines for transmitting and receiving copies of surfaces, one of which machines may be considered as at Boston and the other at New York. These two instruments are in every respect the counterparts of each other except X², Fig. 2, from which the message is sent. A A is a strong wood frame; B B, a metal frame filled with short insulated wires parallel to each other, and at right angles to the plane of the frame. These may be put in as follows: The small wires are previously insulated by thread in the usual manner, then cut into lengths of about an inch, and as many put into the frame as that will receive. Then pour a quantity of liquid sealing-wax on and to fill between them. When cold, grind and polish to a plane and smooth surface on both sides flush with the frame, as represented by the numerous dots. D D are pendulums, which are kept in constant motion by powerful clocks Q Q. The motions of these pendulums are kept isochronous by electric coils and perma-